

## 論文内容要旨

Effect of residence in temporary housing after the Great East Japan Earthquake on the physical activity and quality of life among older survivors

(東日本大震災後の高齢被災者における仮設住宅居住が身体活動量と QOL に及ぼす影響)

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## **Introduction**

The Great East Japan Earthquake (GEJE) and the consequent tsunami struck the northeast district of Japan on March 11, 2011. After the GEJE, the Japanese government built temporary housing complexes in affected areas to temporarily accommodate survivors who had to leave their homes due to the damage caused by the earthquake, tsunami, or the restriction order after the nuclear accident. There are possible health-related issues among residents in temporary housing, including lower physical activity and deteriorating health-related quality of life (HRQOL). In the present study, we aimed to clarify the impact of residence in temporary housing on both physical activity and HRQOL, as well as the physical performance as a result of the lower physical activity among older evacuees residing in temporary housing after the GEJE. Therefore, we assessed the physical activity and HRQOL of older people aged  $\geq 65$  years who were residing in temporary housing and compared these variables to those of older people who were residing in their own homes, and analyzed the degree of correlation between physical activity and the potential factors related to physical activity. The findings of this study could provide supporters or health-care providers in similarly affected areas with clear guidance for the improvement of the health outcomes in this unique group.

## **Methods**

In this cross-sectional study, we collected data from residents who had been evacuated to temporary housing after the GEJE (temporary housing group) and from residents who had continued to live in their own houses (control group). Data were measured from December 2, 2014, to January 22, 2015, in Kashima ward, Minamisoma City. In this study, physical activity, factors related to physical activity (mobility function and muscle strength), and HRQOL were measured. The number of steps walked daily was considered to be representative of physical activity in this study and was recorded using a triaxial accelerometer (e-style2, SUZUKEN Co., Nagoya, Japan). To clarify the prevalence of low physical activity, the number of subjects who had less than 5,000 steps/day in each group by sex was counted. The Timed Up-and-Go (TUG) test was performed to assess mobility function, and muscle strength was determined via the measurement of grasping power, using a dynamometer (GRIP-D, T.K.K 5401; Takei Scientific Instruments, Niigata, Japan). The Medical Outcome Study Short-Form 36 v2™ (SF-36v2™) questionnaire was administered to assess the HRQOL. The scales of eight domains were assessed separately to determine the HRQOL domains that were affected by residence in temporary housing.

## **Results**

A total of 64 subjects (19 men and 45 women) were included in the temporary housing group and 64 subjects (33 men and 31 women) were included in the control group. The

number of steps walked daily was significantly lower in the temporary housing group than in the control group for both men ( $p < 0.05$ ) and women ( $p < 0.01$ ). The TUG test duration was significantly longer in the temporary housing group than in the control group, in both men and women ( $p < 0.01$ ). The grip strength was significantly lower in the temporary housing group than in the control group in men ( $p < 0.01$ ), although no significant difference in this value was observed in the women between both groups. The TUG test duration showed a significant negative correlation with the number of steps walked daily in men ( $r = -0.702$ ,  $p < 0.01$ ), but not women ( $r = -0.261$ ,  $p = 0.083$ ), in the temporary housing group. Grip strength was correlated with the number of steps walked daily in both men ( $r = 0.569$ ,  $p < 0.01$ ) and women ( $r = 0.315$ ,  $p < 0.05$ ) in the temporary housing group. Regarding HRQOL, the bodily pain score was higher in women (but not men) in the temporary housing group compared to that in the control group ( $p < 0.01$ ). However, none of the other scores significantly differed in the men and women between the groups.

### **Discussion**

The number of steps walked daily in the temporary housing subjects was 33% lower than that in the control group in both men and women, indicating that older people residing in temporary housing could be at a greater risk of health deterioration. Loss of connections with their local communities, and physical environment of surrounding area may be one of the major factors for the low physical activity. Regarding mobility function and muscle strength in the temporary housing group, except for mobility function in women, significant correlation was observed between steps walked daily and these variables, suggesting that physical activity level could affect their mobility function and muscle strength. On the other hand, HRQOL did not differ significantly between the groups, although the bodily pain score did show a difference in women. Possible reasons include less frequent exposure to events that could cause pain than those in the control group, and the effect of relief measures on pain. Based on our findings, we suggest that support for older evacuees residing in temporary housing aimed at maintaining their physical activity level is still insufficient, while support for maintaining their HRQOL has been achieved to some extent. Residents in temporary housing should be encouraged to improve their physical activity level so that they can prevent deterioration of mobility function, and muscle strength and subsequent onset of inactivity-related diseases.

### **Conclusions**

We found that the residents in temporary housing were less physically active and had lower mobility function and muscle strength than older people residing in their own houses. Although HRQOL did not decrease in the temporary housing group, the support for older evacuees should focus on maintaining their physical activity level.